

EXHIBIT F



Municipals Weekly

New year, new target ratios

Industry Overview

Key takeaways

- We believe the 10-year AAA ratio will reach 68% and the 30-year ratio 79%.
- AGI and domestic migration does not just flow to low tax states, but also states with faster growing economies.
- We estimate that at least \$25bn of index-eligible taxable bonds will be sold in 2020.

Strategic and tactical views & key forecasts

Strategic	Tactical	Key forecasts
<ul style="list-style-type: none"> • Overweight (OW) 8-20yr part of curve • OW tech-heavy cities • OW credit • OWAMT bonds* • Underweight (UW) the territories • UW small private colleges • UW CA IOU & public utility muni bonds 	<ul style="list-style-type: none"> • Extend to 20-30yr area • Short-duration funds should stay with "extension trade" 	<ul style="list-style-type: none"> • 10yr AAA to move below 0.8% • 30yr AAA to move to 1.3% • 10yr ratio to of 68%; 30-yr to 79% • 2020 issuance to reach \$430bn: tax-exempt at \$300bn, taxable at \$105bn and AMT at \$25bn

Source: BofA Global Research. *If the holder is certain they are not subject to the AMT under current tax law.

Market views & strategies: Supply/demand imbalances will likely push ratios lower and spreads tighter over the next several weeks. The next target for the 10-year AAA ratio is around 68% and, for the 30-year, 79%. We provide more granularity on principal redemptions by coupon type and tax provisions. Size statistics of callable bonds show that smaller bonds are less likely to be called. This may give investors another reason to pick up such bonds as they may also have better spreads.

Migration also follows economic growth: Individuals move for a myriad of reasons; state economies are one of them. Like our earlier work on migration and taxes, we found that domestic migration and AGI tends to flow from weaker- to stronger-growing states.

Estimating the HY market & index-eligible taxables: With the release of two new indices from ICE, we estimate the size of the muni high yield market at \$140-\$150bn. Additionally, we estimate at least \$25bn of "index-eligible" taxable munis to be sold in 2020.

December's defaults total \$175mn: After \$175mn of munis entered debt service default for the first time in December, a total of \$1.3bn of munis defaulted in 2019.

On the Radar: We discuss, among other topics, (1) State tax law changes effective 1 January, including three with individual rate changes; (2) Large earthquakes expose Puerto Rico's still-fragile grid & two-thirds of customers without power; (3) Atlantic City was upgraded by Moody's to Ba3 on improved finances & long-term liabilities settlement; (4) fourth & last Chapter 9 of 2019 filed by Targhee Regional PTA but no munis at risk; (5) The effects of CA's new charter school bill.

10 January 2020

Municipals
United States

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Refer to important disclosures on page 23 to 24.

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Market views & strategies

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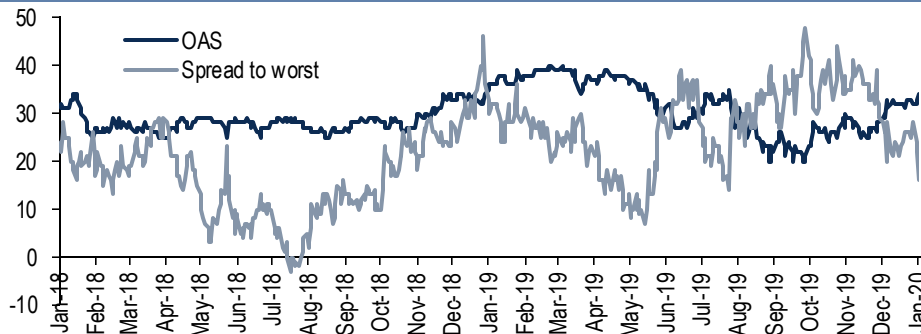
Market outlook: low muni/Treasury ratios and tighter spreads

Geopolitical risks surrounding the US/Iran conflict became the main driver of the market since 3 January, without observable damages to the risk-on atmosphere in the macro market.

Treasury yields bounced around, while muni yields moved steadily lower as supply/demand imbalance gave our market an early achiever surprise—the 10-year muni/Treasury ratio hit our 2020 target of retesting 71% on Wednesday. The 30-year ratio declined to 83%, a multi-decade low since the 1970's. Technical analysis suggests these ratios' moves are an effective breakdown. For example, they broke below weekly and monthly 2-std Bollinger bands, which is rare historically. Our next target area for the 10-year AAA ratio is around 68% and in the 79% area for the 30-year. We believe these are highly likely to get there in the weeks ahead.

As discussed in our [2020 Year Ahead](#), we are slightly positive on credit quality this year, though neutral on credit spreads. The basic rationale is that credit spreads have been very tight. Still, our neutral stance implies that this year there will be periods when spreads move tighter and periods when spreads will move wider, trading around some equilibrium levels. Supply/demand imbalances in the next several weeks convince us that this is the period when spreads are likely to move tighter. This has been the case recently for index spreads-to-worst, though still not in OAS terms yet. See Chart 1, which shows spread-to-worst and OAS for the ICE BofA Single-A muni index (UOA3).

Chart 1: Spread-to-worst and OAS for the ICE BofA Single-A muni index (UOA3)



Source: ICE Data Indices, LLC; Bloomberg. Data as of 9 January 2020

Should the economy slow further or if the stock market has a sizeable correction, we would expect spreads to have short periods of widening later this year.

Principal redemptions by coupon type and tax provision

In our [2020 Year Ahead report](#), we estimated total principal and coupon redemptions of \$403bn for this year, which includes the total for long-term bonds, containing all tax status, fixed or floating coupons such as VRDOs or linked rates. Additionally, our principal redemption estimate is dynamic. As the year progresses, principal redemption volumes should increase steadily due to large volumes of forward and advance refunding activities. As such, \$403bn was only the minimal estimate given at the time of our publication in December. Investors should expect more actual redemptions because forward and advance refunding activities are expected to be large this year.

Redemptions can be scrutinized further, such as by coupon type or by tax status, which may provide investors a more “rubber-meets-the-road” type kind of supply/demand analysis. For example, as of this publication, we find that 2020's principal redemptions

for fixed and zero coupons together will be \$256bn, while the total for floating rate coupons and others together will be \$37bn. See Table 1.

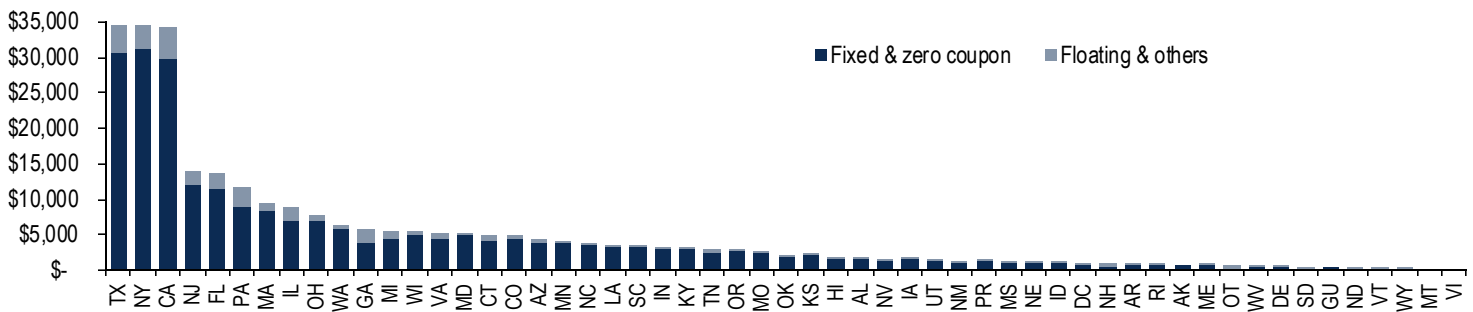
Table 1: Estimates for principal redemptions by coupon type for 2020

Coupon type	\$bn	Coupon type	\$bn
Fixed	249	Floating	12
OID	39	Adjustable Converted to Fixed	1
Zero Coupon	7	Intermediate Appreciation	1
Adjustable	24	CPI Linked	0
Tax Credit	1	Total	293

Source: BofA Global Research

Chart 2 shows the redemption by coupon type for the states and territories. For example, the top largest states, NY, CA and TX, each have around \$30bn of fixed or zero coupon bond principal redemption for the rest of the year, and \$3-\$4.5bn each of floating or others bond principal redemption. Monthly numbers for each state can also be done, which would be even more granular.

Chart 2: 2020 redemptions by state (\$mn)



Source: BofA Global Research; Bloomberg. Note: territories' fixed and zero coupon redemptions in 2020 are PR (\$1,237), GU (323), VI (88), and Other territories (9). For floating or other coupon bonds, PR (\$65) and Other territories (616). States or territories with no floating & other redemptions include: GU, VI, MT, VT and AK

Table 2, below, shows principal redemptions by tax provision for the entire year of 2020, though some included may already have been redeemed at this point.

Table 2: Principal redemptions by tax provision for 2020

Tax provision	\$bn
Tax-exempt	233
Taxable	33
AMT	9
Bank Qualified	18
Total	293

Source: BofA Global Research; Bloomberg

Size matters: smaller bonds less likely to be called

Not all callable muni bonds are exercised on their first call dates. Some of them may never be called and may only get redeemed at their original maturity dates. Holders of such bonds may benefit if issuers leave them that way indefinitely. As such, it is worthwhile to see the profiles of such bonds, to better understand what kind of bonds are less likely to be called. Size appears to be a main factor. Table 3 shows the statistics for the pool of bonds with first possible call dates in year 2019, as well as the pool for the past five years.

Table 3: Bond call exercise size statistics

	2019 callable pool	Never called	2015-2019 callable pool	Never called
Par amount (\$bn)	236	34	1,349	114
Average size (\$mn)	4.08	1.98	3.96	2.44

Source: BofA Global Research; Bloomberg



For the 2019 pool, originally there was \$236bn, but now, only \$34bn remains outstanding. The average size for the original pool is \$4.08mn, though the average size for the uncalled bonds is \$1.98mn.

Let us take a look at the entire pool of bonds with first possible call dates in 2015-2019. This pool originally contained a par amount of \$1,349bn, with an average size of \$3.96mn. Now only \$114bn remains uncalled, and their average size is \$2.44mn.

These statistics show that smaller bonds are less likely to be called, so investors who prefer to hold bonds to maturity may strategically look for smaller CUSIPs. Moreover, smaller bonds may offer better spreads, which is another attractive aspect.

YTD option-adjusted spread (OAS) changes by state and sector: as of 8 January

Through 8 January, most sectors and states' OAS has widened since the end of 2019. As it stands, no sectors' spreads have narrowed for the year-to-date, and only the Local GO and Tax Revenue sectors are unchanged; the remaining 17 sectors' OAS have all widened. By state, only Montana's OAS has narrowed, coming in 1bp YTD, and the District of Columbia's, Nebraska's and New Mexico's are unchanged; all others' widened over the first eight days of the year.

Table 4: YTD change in OAS by state and sector as of 8 January 2020

		Sector	AL	AK	AZ	AR	CA	CO	CT	DE	DC	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY		
AIR	0		-2		2		-1	2		-2	2	1	2		-1	1	1				2				3	1		-1			-2				-3	0		-1		2	1		3		-2	2	0					-			
GO-L	0		-2	1			4	0	1		-1	1	2		-2			0			0		-1	-1	3	3		-2		-1		2	1	-1	1		-1	1	2	-1		1		-1	1	1		1	2		-1				
GO-S	1		1			2	0		1	1		1	2	2		-1					2	0	0	1	1	1	1	2			-1		-6	1	1	1		-1	0	1	1	-1		0	1	0		-1	0	2	1				
HLTH	2		1	4	3		1	2	2	3	3	2	3	1	2	3	2	3	5	1	3	3	4	3	2	1	1	2	3	-1	3		0	3	1	2	1	3	6	0	2		-2	3	3	3	5	3	2	3	3	3			
H-Ed	2		4		-2	1	2	2	2	2	2	2	3			-2	1	2			4	1	1	2	1	3	1	3	2		-1		2	2		-1	-7	3	3	4	2	3	3	3		-2	1	1	4	1	4	3	2		
HOSP	2		1	-3	2		-1	2		-1	-1		2	1		-2	2	1		-2	3	3	2	2	3	1	3	3	4	3	4	3	2	2	2	2	1		-2	2	1	-1	1	3	2	3	2	2		-1	2	2	2		
IDR	1		4	-1	3		-3	1					-1		-3	5	1			-1	-1		-1				-2	3		-1			3	-1		-2			-5		-1		1	0				-0		-3					
LCA	2		-2	-1	1		-2	2				1	1		4	3	2		1	1	2		-2	1	1	1	2	1		3		-1		1	-2	2	1	1		-1	4	0	1		-1			-2		-4	2				
MISC	2		0		-0		-2		-1			-1			-1	0	3			3	1	-1	1	1	2	3							3	1	2	1		-4		0	1	5	1						-0		-0				
MFH	4			-7	9			-1	3		10		-2	3		0		0				6	6	3	3	7							2		-3			3		-8	4	4			-2	6			5	2		-2			
PC	1				-2	-1	0					6	12		5					10			1	1				1	3	-1				-6	3		-3	2			-22					-4				-1					
PWR	2		-2	2	2		-2			-1		3	1	2		3	2		1	3	4				-0	2	3	3		-1					-1	3		-2	1				-0		0	1	1			-1	-1		-2		
SFH	7		-5			-4	8	9	5		7	5		9	7		8				6	8	8	8	2		-5		-8	9			8	9	5	8	10	8	-6	6	7	7	9	7	6	7		-5	9		-11	9			
TR	0		1	4	1	6	1	3	2	1	-1	2	0		-2	1	1		3	5	1	1	1	0	1		-2	3		-2			1	1	-1	3	-2	1	2	0	1	3	3	1	3	2		-2	2		-2				
TBCO	5		4			-4				-14						-1					4												9		-9					-2	3							-4							
T&T	1					-2	0			-3	-1	0				0					5	2	2	0	1								1	3		-2	2		-2	2		-1				1			4		8				
TRAN	1		-2	1	1		-0	3		1	-1	3	1	-2	2	-1	2		1	2	2	-1	3	1	0			0					-2	0	2	1		0	-1	1	-2	1			-1		-2	1	2	0					
UTL	2		-1		-1		-2	1	0		-6	3	2			-1	1			1	4			-1	2	1	1	-2		-1	3	1	0	1	1	-1		-0	-2	-1		-1		-1		-1		-2	-7	2	3				
W&S	1		2		-0	5	1	2	-1		1	1	1	1	-2	1	2		5	3	2		-1	2	1	1	-1	-1	3	2			-1	2		-2		-2	-1	-6	3	1		-2	1	3		0		-1					
Total	1		1	1	2	3	1	2	1	1	0	1	2	2	3	2	2	3	1	2	1	2	1	1	1	2	2	2	-1	0	1	2	2	0	1	1	4	2	1	1	1	2	2	4	2	2	2	3	2	1	3	2	3		

Source: ICE Data Indices, LLC; BofA Global Research. Note: AIR refers to Airports; GO-L refers to GO Local; GO-S refers to GO State; HLTH refers to Health; H-ED refers to Higher Education; HOSP refers to Hospital; IDR refers to Industrial Development Revenue; LCA refers to Leases, COPs & Appropriations; MISC refers to Miscellaneous; MFH refers to Multi-Family Housing; PC refers to Pollution Control; PWR refers to Power; SFH refers to Single-Family Housing; TR refers to Tax Revenue; TBCO refers to Tobacco; T&T refers to Toll & Turnpike; TRAN refers to Transportation; UTL refers to Utility; and, W&S refers to Water & Sewer.

Migration also follows economic growth

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In our [last Weekly](#), we discussed both Adjusted Gross Income (AGI) and domestic migration patterns as it relates to taxes. Generally, we find that both flow downhill – that is, low- or lower-tax states benefit from AGI and domestic migration from high- or higher tax states.

But, as we said there, individuals move for a myriad of different reasons. Indeed, while tax rates appear to be one of many factors in a person's choice of residence, it is but one consideration.

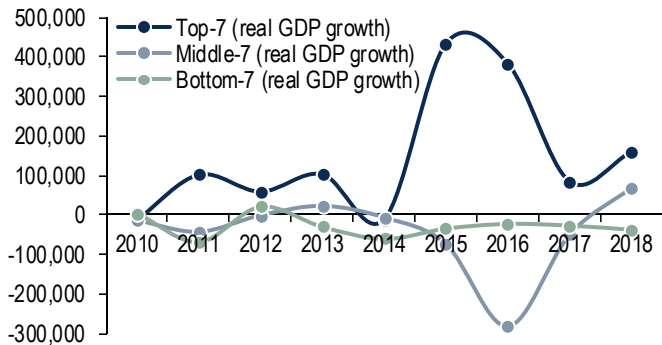
As we noted roughly a year-and-a-half ago, a state or local area's underlying economics are also significant factors. In fact, United Van Lines 2019 National Movers Study found that the states' economic performances was a key factor driving migration patterns across the US in 2019; so too were Baby Boomers reaching retirement age, which we note likely factors in tax considerations, but also housing costs.

Chart 3, below left, shows annual domestic migration for the top-, middle- and bottom-seven states by annual real GDP. Like Chart 4 in our [last Weekly](#), the chart is dynamic; in other words, states included change as their economic growth rates change and those of the other states do.

Between 2010 and 2018, the top-seven states' aggregate net domestic migration was net positive in every year save for 2010 and 2014. The bottom-seven states' was net negative in each year except for 2010 and 2012.

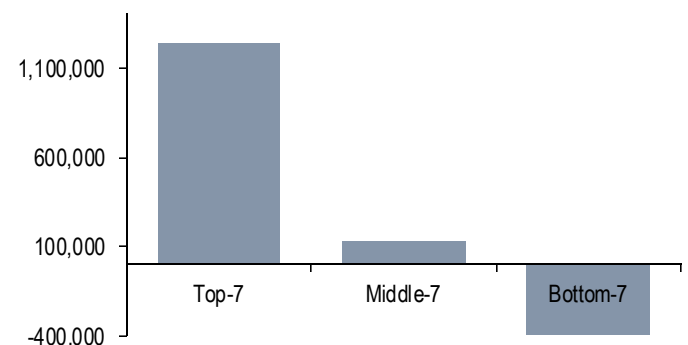
Chart 4, below right, shows domestic migration by the top-, middle- and bottom seven states by real GDP compound annual growth rates between 1Q10 and 4Q18. This data is arguably more convincing than that in Chart 3; it shows that sustained growth over a longer period of time may drive domestic migration shifts.

Chart 3: States with the fastest economic growth attracted over 159K Americans in 2018 versus the slowest growings' net loss of -38K



Source: BofA Global Research; Bureau of Economic Analysis; US Census Bureau. The above Chart shows the net domestic migration in a given year for states based on the YoY real GDP change.

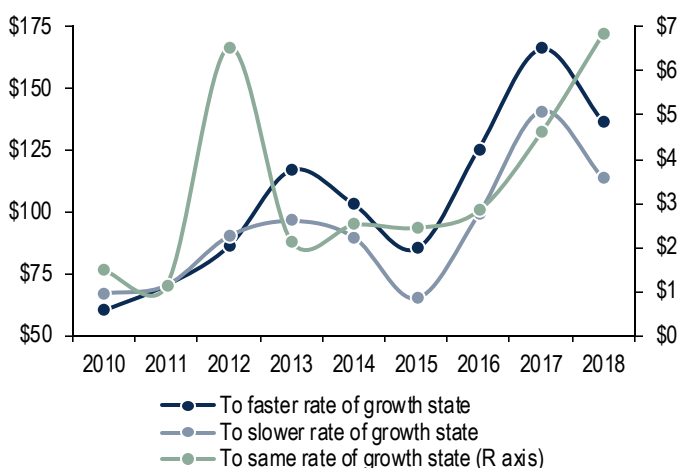
Chart 4: From 2010 to 2018, states with the fastest real GDP CAGR attracted over 1.2mn domestic migrants



Source: BofA Global Research; Bureau of Economic Analysis; US Census Bureau. CAGR between 1Q10 and 4Q18

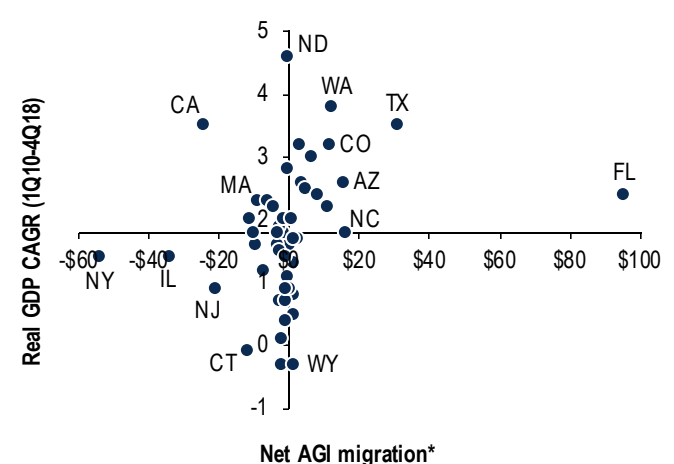
Both above analyses broadly comport with domestic migration patterns analyzed against top marginal tax rates. And so too does AGI migration versus economic growth.

Chart 5: Faster growing states by real GDP attracted \$118bn of AGI from slower growing states between 2010 and 2018



Source: BofA Global Research; Bureau of Economic Analysis; IRS. The above Chart shows the net AGI migration in a given year between states based on the YoY real GDP change.

Chart 6: Cumulative net AGI migration¹ versus economic growth² (\$bn)



Source: BofA Global Research; Bureau of Economic Analysis; IRS. ¹Cumulative net AGI migration (inflow-outflows) for 2010-2018 period. ²Economic growth is real GDP CAGR between 1Q10 and 4Q18

This is unsurprising. In fact, in our previous work, we found that, when analyzing both domestic migration and the costs of living, population migration occurred at greater rates from less costly states to more-costly states than vice versa. That work, the data from our [last Weekly](#) and that which we discussed here implies, on average, taxpayers move to seek lower taxes and an overall better standard of living.

Estimating index-eligible taxables in 2020

In 2019, nearly \$71bn of taxable munis were issued; in 2020, we are expecting \$105bn. Given the global yield environment and increased supply of taxable munis, we expect foreign buyers' interest in the asset class to only increase.

Many foreign buyers prefer index-eligible taxable munis – those with CUSIPs with at least \$300mn each. Based on the historical shares of index-eligible taxables as a percentage of total taxable, we estimate that between \$25bn and \$27bn of taxable, index-eligible munis will be issued.

Table 5: \$18.3bn of index-eligible taxables issued in 2019 – the highest since the BABs era (\$bn)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Index-eligible	30.13	46.59	7.70	3.21	3.54	1.87	1.96	2.93	5.43	7.18	18.32
Not index-eligible	53.44	106.36	20.85	24.20	27.29	19.62	24.88	25.29	26.77	21.72	52.58
Total issued	83.57	152.96	28.55	27.41	30.83	21.48	26.84	28.22	32.20	28.91	70.90
% index-eligible	36.1%	30.5%	27.0%	11.7%	11.5%	8.7%	7.3%	10.4%	16.8%	24.8%	25.8%

Source: BofA Global Research; Bloomberg. Note that issuance is limited to fixed coupon taxables issued with an original maturity of at least 13 months.

Of course, this estimate is likely a minimum as issuers react to buyers' preferences. To that end, it's possible the final figures may prove higher as the taxable market continues to evolve in 2020.

December's defaults total \$175mn

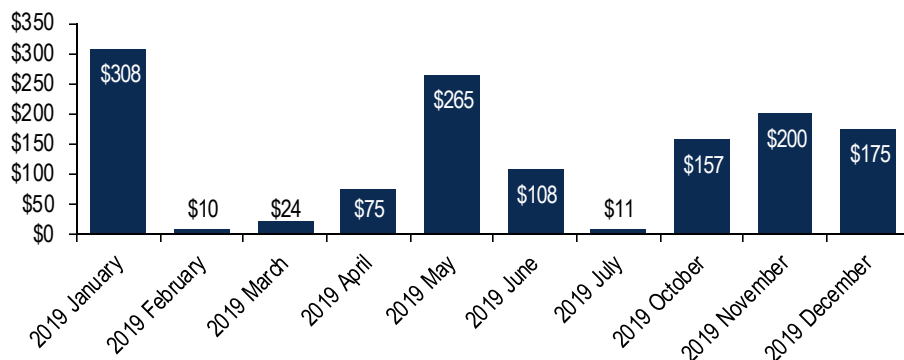
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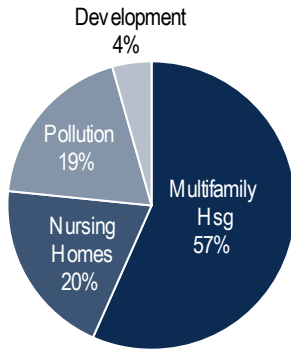
In December, \$175mn in total outstanding par value of municipal bonds entered into debt service payment default for the first time – the fourth-highest monthly total of 2019. In total, \$1.3bn of munis defaulted during the previous year.

Chart 7: 2019's monthly muni defaults* (\$mn)

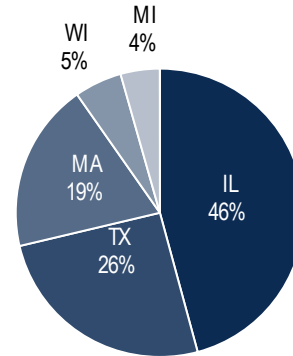


Source: Bloomberg; BofA Global Research. Data as of December 2019. *Default defined as monetary default when municipal bonds enter into the debt service payment default for the first time.

The Multifamily Housing sector accounted for the majority of defaults (57%). Nursing homes was second, with \$35mn bonds in Texas defaulting. Looking to Chart 9, Illinois had the greatest amount of defaults by state (46%).

Chart 8: December 2019 defaults by sector

Source: Bloomberg; BofA Global Research. Data as of November 2019. *Default defined as monetary default when municipal bonds enter into the debt service payment default for the first time

Chart 9: December 2019 defaults by state

Source: Bloomberg; BofA Global Research. Data as of November 2019. *Default defined as monetary default when municipal bonds enter into the debt service payment default for the first time

On the Radar

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State taxes: Big changes in '20

- On 1 Jan 2020, 35 states had major tax changes go into effect. Notably, three states—Arkansas, Massachusetts and Tennessee, saw changes in their individual income tax rates and three states—Florida, Missouri and New Jersey saw changes to their corporate income tax rate. See Table 6 and Table 7, below.

Table 6: Individual income tax changes (As of 1 Jan 2020)

State	2019 Top rate	2020 Top rate	2019 Number of brackets	2020 Number of brackets
Arkansas	Middle-income earners: 6%	Middle income earners: 5.9%	Middle-income earners: 6	Middle-income earners: 6
	High-income earners: 6.9%	High-income earners: 6.6%	High-income earners: 6	High-income earners: 4
Massachusetts	5.05%	5%	Single-rate tax	Single-rate tax
Tennessee	Investment income only: 2%	Investment income only: 1%	Single-rate tax	Single-rate tax

Source: The Tax Foundation

Table 7: Corporate income tax changes (As of 1 Jan 2020)

State	2019 Top rate	2020 Top rate	2019 Number of brackets	2020 Number of brackets
Florida	4.458%	4.458%*	Single-rate tax	Single-rate tax
Missouri	6.25%	4%	Single-rate tax	Single-rate tax
New Jersey	11.5% (9% base rate and 2.5% surcharge)	10.5% (9% base rate and 1.5% surcharge)	4	4

Source: The Tax Foundation. *Note: In Florida, for corporate income and franchise tax rates, legislation was enacted to extend 2019 rates to 2020 and 2021. Rates were originally supposed to change back to 5.5% (2018 rates).

In the table below, we summarize other state tax changes as of 1 January 2020. Please refer to each state's tax website for further details.

Table 8: Summary of key state tax changes (As of 1 Jan 2020)

Tax change	States
Reductions in individual income tax rates	Arkansas, Massachusetts, Tennessee
Notable changes to their individual income tax bases	Iowa, Kansas, Maine, North Carolina, Ohio
Increase in corporate income, capital stock, franchise, or similar taxes on businesses or financial institutions	Washington
Decrease/elimination of corporate income, capital stock, franchise, or similar taxes on businesses or financial institutions	Connecticut, Florida, Illinois, Indiana, Missouri, Mississippi, New Jersey
New Corporate Activity Tax (CAT)	Oregon
Sales tax rate change (reduction)	Florida
Estate tax change	Connecticut, Minnesota, Vermont, New York, Hawaii
New excise tax on cannabis	Illinois, Louisiana
Application of excise taxes to vapor products	Maine, Nevada, New Hampshire
Marketplace facilitators required to collect sales taxes	Hawaii, Illinois, Michigan, Wisconsin
Modified economic nexus threshold in remote sales tax collection requirements	Arizona, Georgia, Washington
Will begin using Wayfair-like standards to determine economic	Hawaii, Pennsylvania



Table 8: Summary of key state tax changes (As of 1 Jan 2020)

Tax change	States
nexus for income tax purposes	
Notable changes to sales tax base	Connecticut, Virginia
Notable changes to corporate income tax base or apportionment formulas	Arkansas, Maryland, Missouri, New Hampshire, New Mexico, Tennessee
Various road user taxes and fee changes	Illinois, Kansas, Nevada

Source: The Tax Foundation

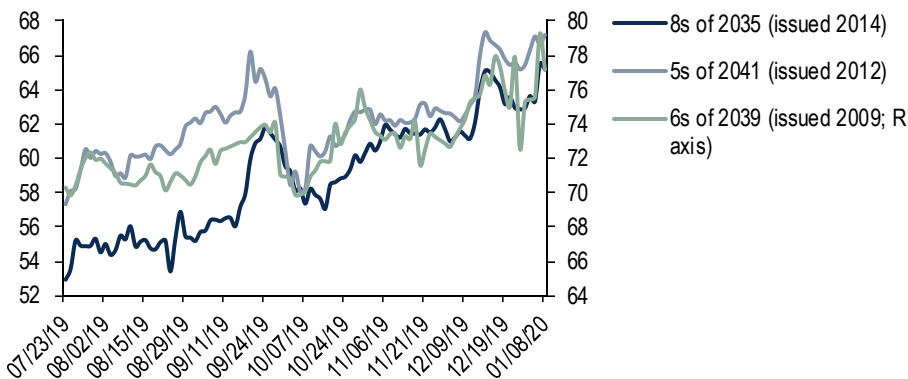
Puerto Rico: earthquakes expose fragile grid

- **Tuesday's 6.4 magnitude earthquake exposes fragile grid:** On Monday, a 5.0 magnitude earthquake struck Puerto Rico. If that weren't severe enough, on Tuesday a 6.4 magnitude earthquake struck the commonwealth. The result: about two-thirds of PREPA's 1.5mn customers are without power and some 250,000 of PRASA's customers are without water.
- The critically-important Costa Sur Power Plant in Guayanilla – constructed during the 1960s and 1970s – has been severely damaged, with PREPA's executive director saying it will probably be out for “over a year.”
- When asked whether the length of time is related wholly to the earthquake or lack of maintenance, PREPA's executive director said: “It's both really. To be honest, those plants have over 60 years basically...Imagine you have a taxi, 60 years old, and you are required to run that 24/7. That's the kind of business we're running.”
- In the post-Hurricane Maria period, electric demand in the commonwealth has averaged 2,500 megawatts per month. The Costa Sur Power Plant's 5 and 6 generators – operating at a capacity factor of nearly 60% – combine some 570 megawatts, or about 23% of demand.
- To make up for that, Puerto Rico may have to increase capacity at its Aguirre plant – which itself was built in the 1970s.
- **Largest quake in a long line of tremors:** Monday's and Tuesday's earthquakes were the largest earthquakes among the nearly 1,000 earthquakes and aftershocks the US Geological Survey estimated occurred since 31 December. Tuesday's 6.4 earthquake is the largest recorded in more than 100 years.
- **President Trump declares an emergency in Puerto Rico:** Immediately following Tuesday's earthquake, Governor Vazquez declared a state of emergency in Puerto Rico, and requested federal aid. On 7 January, President Trump declared an emergency in Puerto Rico, and “ordered Federal assistance to supplement Commonwealth and local response efforts due to the emergency conditions resulting from earthquakes beginning on December 28, 2019, and continuing,” according to an 8 January White House press release.
- As part of that order, the Department of Homeland Security and FEMA may provide “provide appropriate assistance...under Title V of the Stafford Act.” Per the release, “FEMA is authorized to identify, mobilize, and provide at its discretion, equipment and resources necessary to alleviate the impacts of the emergency. Emergency protective measures, limited to direct Federal assistance, will be provided at 75 percent Federal funding.”
- **Pleas for quicker aid than after Maria:** Much of the aid approved after Hurricanes Irma and Maria has not reached the island. Of the roughly \$44bn of funding allocated for Puerto Rico, just \$15bn or so has actually made its way to Puerto Rico.
- Much of that delay has to do with federal concerns over how local officials spend the money. According to a spokesman for the Office of Management and Budget, “Under President Trump, Puerto Rico has received more recovery funds than at any time in U.S. history. While we continue to ensure Puerto Rico has what they need, we must also make sure the proper guidelines are in place to make certain the people of Puerto Rico directly benefit, not politicians with their history of corruption.”
- But some democratic lawmakers are calling for a release of funds, particularly from the Department of Housing and Urban Development. Of the \$20bn of Community Development Block Grant disaster relief program funds appropriated by Congress for

Puerto Rico following the hurricanes, Puerto Rico has access currently to just \$1.5bn, and just \$5.8mn of it has been spent.

- A letter sent to HUD Secretary Ben Carson from democrat lawmakers said “Not only does it defy common sense to withhold these overdue funds now, when the Island just suffered an earthquake, but doing so is immoral and illegal.”
- **Damage estimates still uncertain:** It is still too early to estimate the extent of the damage from these earthquakes, according to government officials. However, reports are that hundreds of homes and business were impacted.
- Others, like Estudios Técnicos’ chairman said estimates now are “impossible,” but to some degree minimized the economic impact. He said: “Yes it will have a negative impact but probably not so much in terms of damage to the infrastructure — probably not too much except in very specific locations — but in terms of introducing another risk factor that up to now was simply not there. No one really gave earthquakes too much thought. Obviously, there will be additional tasks for [Federal Emergency Management Agency] and the local authorities, and this may mean redirecting resources from other uses. Knowing how much damages amount to will have to wait, but what we do know is that there is a new risk factor to be taken into account that wasn’t there a couple of weeks ago.”
- That said, Enki Research – a catastrophe modeler – estimated that the earthquakes could cost Puerto Rico \$3.1bn in economic losses.
- **GO levels, thus far, largely unaffected by earthquakes:** As Chart 10, below shows, thus far GO trading prices are largely unaffected by the earthquakes.

Chart 10: Average trading prices of select Puerto Rico GOs



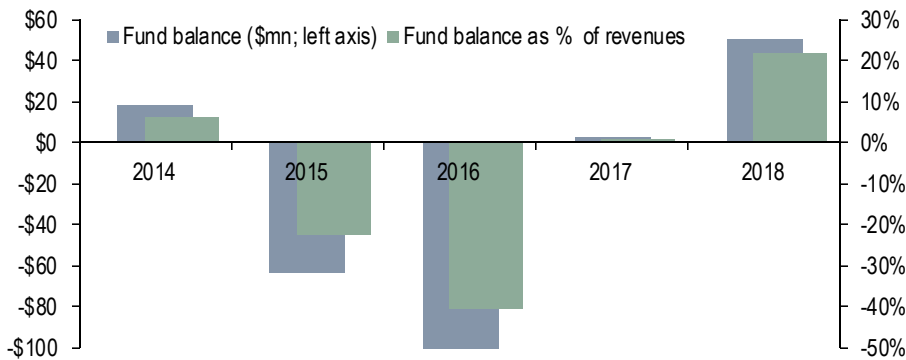
Source: Bloomberg; BofA Global Research. As of 8 January.

- **TSA balance at \$8.7bn to end 2019:** As of 27 December, Puerto Rico’s operating account balance – its Treasury Single Account, or TSA – stood at nearly \$8.7bn. That balance was down \$188mn, or 2.1% week-over-week. Still, balances are up 5.6% month-over-month and 129.6% on a year-over-year basis.

Atlantic City, NJ: Moody’s upgrades to Ba3

- **Moody’s upgrades Atlantic City’s rating two notches:** On 2 January, Moody’s upgraded Atlantic City’s long-term issuer rating to Ba3 from B2. The upgrade reflects the city’s “successful settling of long-term, open-ended liabilities and the concomitant improvement in city finances, the successful implementation of the casino PILOT program, the recent health of the casino industry, and the ongoing efforts to diversify.”
- Also factored into the rating is the “strong oversight by the State of New Jersey,” although set to expire within two years. The outlook was revised to stable from positive.
- **City in better financial position:** After Moody’s adjustments, 2018 fund balance shot up to \$50.3mn, or 22% of revenues, from \$2.5mn, or 0.8% of revenues, the year prior. This is a substantial improvement after the fund balance plunged to -\$105.3mn, or -40.5% of revenues, in 2016. See Chart 11.



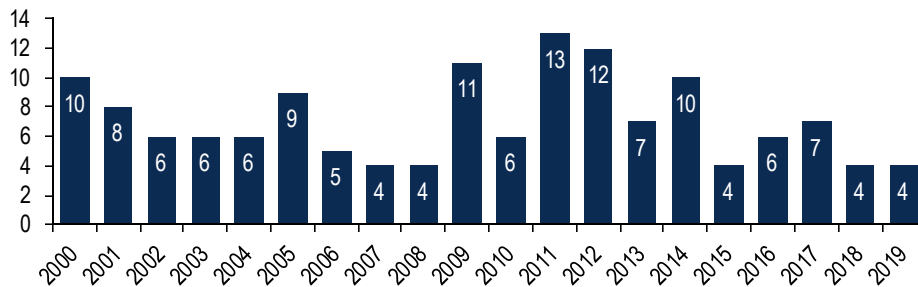
Chart 11: Atlantic City's fund balance reaches highest level in five years

Source: Moody's Investors Service. Fund balance figures reflect Moody's adjustments.

- As stated in the report, "Moody's makes certain adjustments to New Jersey local governments' fund balances to include receivables and reserves that would be eligible to be included in fund balance under GAAP accounting but are excluded as a result of state statutory accounting regulations. The adjustments also net out the impact of deferred charges which cause fund balance to be overstated."
- **The fund balance volatility stems from large deferred charges:** (1) \$108mn in casino tax appeals in 2017 and (2) \$44.8mn in prior outstanding payables in 2018 – pension and OPEB bills paid with bond proceeds and therefore moved to the long-term debt statement from the Current Fund balance sheet. Moody's points out that they "view the settlements as a major credit positive both for the substantial savings and for the budgetary certainty gained."
- **Health of casino industry improves and continued efforts to diversify:** Starting in 2016, casino revenues became positive for the first time in a decade. That trend continued, and revenues have grown even stronger in each subsequent year, adjusting for the Trump Taj Mahal closing in 2017. In an effort to diversify away from its concentration in casinos, the city welcomed an Atlantic City campus for Stockton University, which opened in 2018, and corporate offices for South Jersey Gas Company.
- **Casino PILOT program a success:** Moody's notes that the city "benefitted enormously from the Casino Property Tax Stabilization Act (PILOT bill) which converted casino property taxes into payments-in-lieu-of-taxes (PILOTs)." Going forward, casinos can no longer appeal their tax bills, resulting in a more predictable revenue stream for the city. For fiscal 2018, casino PILOTs were \$68.8mn, or 30% of revenues, beating out the \$40.1mn from regular property taxes.
- **Despite improvements, financial and economic stress remains:** The city's tax base has been shrinking since 2007 and is essentially prevented from raising taxes given its very weak wealth and income levels. The median family income level has plummeted to 43.5% of the national level from 63.9% in 2000. On top of that, 40.6% of the population is below the poverty line. The city's unemployment rate is on a downtrend, but still significantly high at 6.9%, more than double the 3.3% state and national rates as of October 2019.

Targhee Regional PTA: last Chapter 9 of 2019

- **Targhee Regional PTA filed for Chapter 9 bankruptcy protection in December:** In December, the Targhee Regional Public Transportation Authority (TRPTA) filed for Chapter 9 bankruptcy protection – the fourth, and last of such filings in 2019. That excludes Puerto Rico Public Buildings Authority's PROMESA Title III filing.
- By any count, 2019 Chapter 9 bankruptcy filings were low by historical standards. We expect low bankruptcy filings again this year.

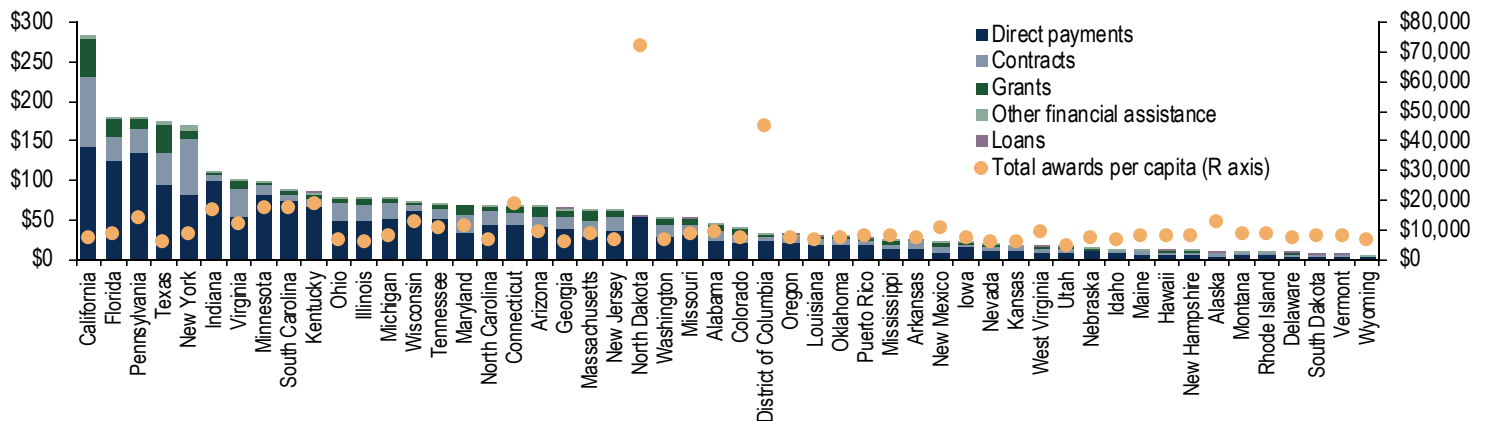
Chart 12: There were only four Chapter 9 filings in 2019

Source: PACER; BoFA Global Research

- According to TRPTA's bankruptcy documents, it has a total of \$378,622 in unsecured liabilities, the largest of which is a \$147,564 loan from a regional bank. Neither EMMA nor Bloomberg data shows any outstanding TRPTA munis.

Federal spending: states awarded \$3tn in 2019

- Federal government awarded \$3.0tn to the states in CY 2019:** According to data from USA Spending.gov – the official source for spending data for the US Government – the 50 states, the District of Columbia and Puerto Rico were awarded a total of \$3.0tn in calendar year 2019.
- Note that this spending is not limited to intergovernmental transfers; rather it reflects all federal funding from direct payments, contracts, grants, loans and other financial assistance from the federal government to recipients in the state, including but not limited to state and local governments.
- For instance, Chart 13 below shows that California received a total of \$281.4bn of awards in 2019; however, the State of California itself was awarded \$78.3bn during that time period – the largest of any award recipient.

Chart 13: California, Florida, Pennsylvania, Texas and New York accounted for over 1/3rd of all federal awards in 2019

Source: USA Spending.gov; US Census Bureau; BoFA Global Research. Note the above does not reflect solely that funding to state and local governments; rather, it includes all recipients of federal awards in a state, with those awards based on the primary place of performance.

- The chart also shows those awards on a per capita basis. The 50-state, DC and Puerto Rico median is \$8,000 per capita. Both North Dakota and the District of Columbia are extreme outliers: North Dakota's per capita award is over 9.0x the median and DC's is over 5.6x.

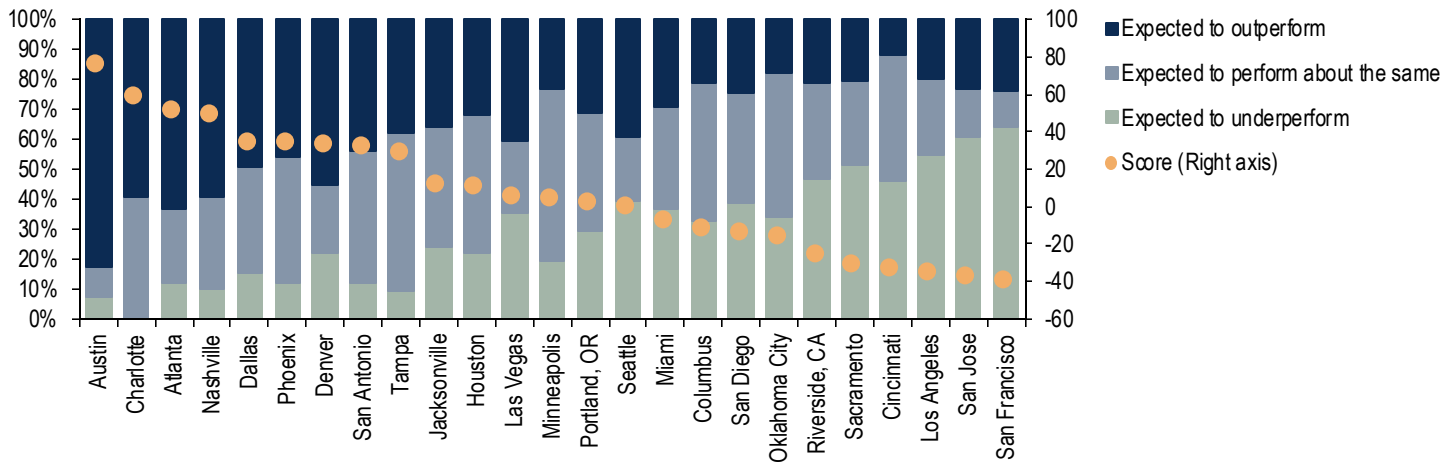
Housing: Sun Belt expected to outperform

- Zillow releases survey results:** On 1 January, Zillow released its results for its "Q4 2019 Zillow Home Price Expectations Survey" with responses from more than 100 US economists and real estate experts on 25 large markets nationwide. Zillow reports

that “on average, panelists said they expected US home values to grow by 2.8% in 2020.” Based on the responses, scores were created for each of the 25 markets by weighing the expectations for outperformance against underperformance. Performance was measured against the national average.

- **Most outperformance expected along the Sun Belt:** The top-three expected to outperform were Austin (76), Charlotte (59) and Atlanta (51). The bottom-three, all in California, were Los Angeles (-35), San Jose (-38) and San Francisco (-40). Charlotte was the only city that had no expectation for underperformance. Of the 14 cities expected to outperform, only three were outside of the South: Denver (33), Minneapolis (4) and Portland (2). See Chart 14, below.

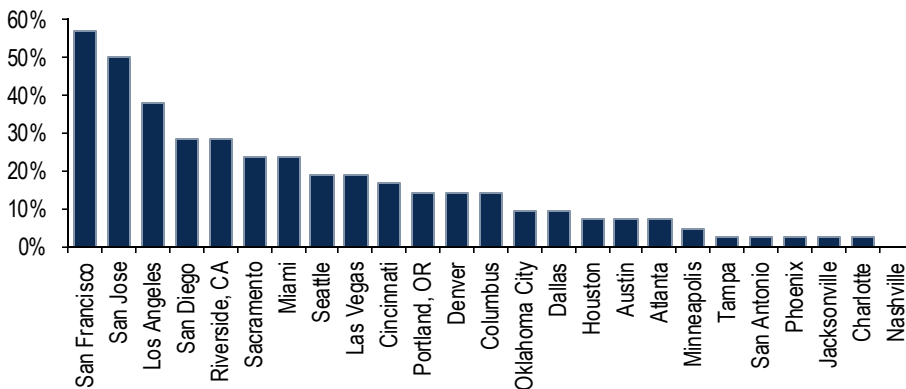
Chart 14: Results from recent Zillow Home Price Expectations Survey



Source: Zillow Home Price Expectations Survey, 2019 Q4

- **California markets most expected to see price declines:** When asked where home values were most expected to drop, California cities held the top-six positions and included: San Francisco (57.1%), San Jose (50.0%), Los Angeles (38.1%), San Diego (28.6%), Riverside (28.6%) and Sacramento (23.8%). Nashville was the only city where no respondents expected a decline in home values for 2020. See Chart 15, below.

Chart 15: Respondents mostly expect home price declines in California



Source: Zillow Home Price Expectations Survey 2019 Q4

The age of the states: UT youngest by a mile

- **Nearly 30% of Utah's residents are under 18 years old:** As part of its annual release of population estimates, the Census Bureau releases estimates of states' 18-years-old-plus population. The data shows Utah is the youngest state, and by a wide margin: 29% of the state is below age 18 compared to the 50-state, District of Columbia and Puerto Rico median of 22.1%.

Table 9: 26 construction sector and sub-sectors set all-time November highs in 2019 (\$bn)

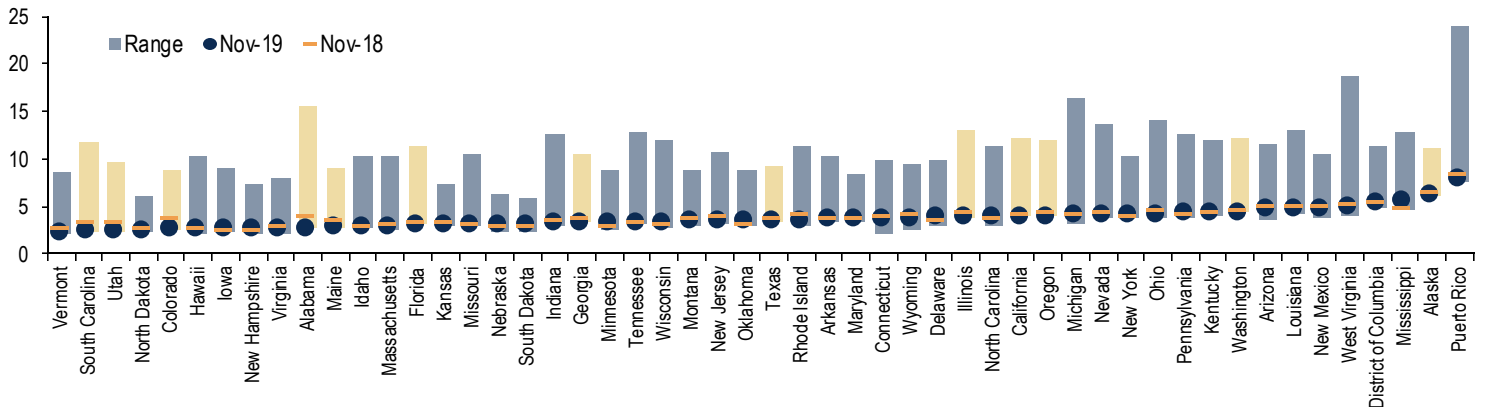
Sector	Nov-19	Previous high	Previous high date	Nov 2019 vs previous high		Sector	Nov-19	Previous high	Previous high date	Nov 2019 vs previous high	
				\$	%					\$	%
Total	313.8	290.8	Nov-08	23.0	7.9%	Mass transit	10.9	8.7	Nov-18	2.2	25.2%
Nonresidential	307.7	285.6	Nov-08	22.1	7.7%	Line	8.2	7.3	Nov-08	0.9	11.8%
Pavement	64.5	59.0	Nov-16	5.4	9.2%	Conservation & dev.	3.5	3.4	Nov-17	0.1	4.4%
Transportation	36.7	32.3	Nov-18	4.3	13.4%	Sports	3.5	2.7	Nov-02	0.7	27.4%
Sewage & waste disp.	26.1	25.5	Nov-08	0.7	2.6%	Line/drain	3.1	3.0	Nov-18	0.1	4.3%
Water supply	17.5	17.2	Nov-08	0.3	1.7%	Lighting	3.0	2.6	Nov-18	0.3	12.2%
Air	17.3	15.3	Nov-18	2.0	13.0%	Commercial	2.5	2.5	Nov-02	0.0	1.8%
Land	16.9	16.5	Nov-15	0.5	2.8%	Water	2.5	2.3	Nov-07	0.2	8.2%
Amusement & rec.	13.5	12.2	Nov-18	1.3	10.9%	Dock/marina	2.2	1.8	Nov-12	0.4	25.2%
Waste water	12.0	11.1	Nov-09	0.8	7.6%	Social center	1.7	1.7	Nov-03	0.0	1.2%
Air passenger terminal	11.9	10.7	Nov-18	1.2	10.8%	Medical building	1.5	1.2	Nov-04	0.3	20.0%
Line/pump station	11.6	11.2	Nov-15	0.4	3.4%	Neighborhood center	1.5	1.5	Nov-08	0.0	0.4%
Middle/junior high	11.6	11.4	Nov-07	0.2	1.7%	Special care	1.0	0.8	Nov-11	0.2	25.6%

Source: US Census Bureau; BoFA Global Research

Unemployment: 13 states, 26 metros set lows

- **13 states set new unemployment rate lows in November:** In November, South Carolina (2.4%), Utah (2.4%), Colorado (2.6%), Alabama (2.7%), Maine (2.8%), Florida (3.1%), Georgia (3.3%), Texas (3.4%), Illinois (3.8%), California (3.9%), Oregon (3.9%), Washington (4.4%) and Alaska (6.1%) set historic unemployment rate lows.
- On average, the states are 0.4ppt from their respective historic lows. Connecticut is furthest away, with its current rate 1.5ppt from its 2.2% rate achieved in October 2000.

Chart 17: State unemployment rates versus their historical ranges (%); 13 states set record lows in November



Source: Bureau of Labor Statistics; BoFA Global Research. Series began January 1976. Note: states which historical range is shaded in yellow set new unemployment rate record lows in October 2019.

- **57% of metro areas' unemployment rates fell in November:** Bureau of Labor Statistics' November data shows that unemployment rates were lower in 223 metro areas on a year-over-year basis, higher in 137 metro areas and unchanged in 29.
- The lowest unemployment rate is in the Logan, UT-ID metro area at 1.5%; the highest is in El Centro, CA, at 20.6%.
- The most significant YoY unemployment rate improvement was Kokomo, IN's 4.6ppt decline; El Centro, CA's increased 2.1ppt, more than any other metro area.
- **26 metro areas set all-time unemployment rate low in November:** Of the 389 metro areas (or 395 including those in Puerto Rico), 26 set new all-time unemployment rate lows in November. As Table 10 shows, most of those metro areas are concentrated in Georgia and Oregon.

Table 10: All-time unemployment rate lows set concentrated in GA, FL, WA and OR in November

Metro area	November 2019 rate	Previous low date	Previous low rate	Metro area	November 2019 rate	Previous low date	Previous low rate
Provo-Orem, UT	1.691%	Oct-19	1.695%	Rome, GA	3.109%	Nov-00	3.148%
Savannah, GA	2.570%	Dec-00	2.825%	Portland-Vancouver-Hillsboro, OR-WA	3.125%	May-19	3.267%
Atlanta-Sandy Springs-Roswell, GA	2.576%	Dec-00	2.585%	Port St. Lucie, FL	3.126%	Apr-06	3.220%
Brunswick, GA	2.646%	Apr-19	3.045%	Columbus, GA-AL	3.195%	Oct-19	3.494%
Gadsden, AL	2.683%	19-Sep	2.749%	Medford, OR	3.201%	Oct-19	3.634%
Warner Robins, GA	2.701%	Sep-19	3.011%	Baltimore-Columbia-Towson, MD	3.204%	Dec-07	3.264%
Miami-Fort Lauderdale-West Palm Beach, FL	2.713%	Apr-06	2.814%	Salem, OR	3.257%	May-19	3.530%
Palm Bay-Melbourne-Titusville, FL	2.780%	Apr-06	2.785%	Chicago-Naperville-Elgin, IL-IN-WI	3.270%	Sep-19	3.353%
Augusta-Richmond County, GA-SC	2.808%	Sep-19	2.999%	Eugene, OR	3.340%	May-19	3.560%
Seattle-Tacoma-Bellevue, WA	2.897%	Apr-98	2.912%	Carbondale-Marion, IL	3.362%	Oct-06	3.394%
Macon-Bibb County, GA	2.934%	Oct-19	3.318%	Albany, GA	3.391%	Oct-19	3.665%
Hinesville, GA	3.084%	Apr-19	3.315%	Albany, OR	3.570%	May-19	3.796%
Bend-Redmond, OR	3.089%	May-19	3.286%	Grants Pass, OR	4.055%	May-19	4.297%

Source: Bureau of Labor Statistics; BoFA Global Research

California's AB 1505: positive for school districts

- **School districts to have more power to deny new charter schools:** On 1 January, Assembly Bill 1505 went into effect in California; AB 1505 is a bill that overhauled existing charter school rules. Most notably, local school boards are now allowed to reject new charter school petitions based on financial impact on the school district and if the charter school will offer programs different from those existing. Please see our [Municipals Weekly: 06 September 2019](#) for more details on AB 1505.
- **Legislation is credit positive:** As previously discussed, we view this legislation as a credit positive for all California school districts, but especially for financially distressed districts which will be able to deny new charter schools. Many school districts in the state experienced declines in enrollment due to charter school competition.
- We analyzed the top 20 largest California school districts by 2018-2019 enrollment figures and found that, generally, as rating decreased, the percentage of charter school enrollment increased.

Table 11: Top 20 school districts by 2018-2019 enrollment

Districts with a Negative or Qualified Certification have been highlighted in red and orange, respectively

Rank	District	Moody's Rating	Charter	Non-Charter	Total	% Charter
1	Los Angeles Unified	Aa3	154,447	453,276	607,723	25.41%
2	San Diego Unified	Aa2	20,911	103,194	124,105	16.85%
3	Fresno Unified	Aa3	2,500	70,749	73,249	3.41%
4	Long Beach Unified	Aa2	286	72,935	73,221	0.39%
5	Elk Grove Unified	Aa2	1,048	62,869	63,917	1.64%
6	San Francisco Unified	Aa2	7,922	52,468	60,390	13.12%
7	Capistrano Unified	N/A	6,064	47,205	53,269	11.38%
8	Corona-Norco Unified	Aa2	-	53,002	53,002	0.00%
9	San Bernardino City Unified	A1	3,837	48,936	52,773	7.27%
10	Santa Ana Unified	Aa3	4,885	46,597	51,482	9.49%
11	San Juan Unified	Aa2	10,730	39,779	50,509	21.24%
12	Oakland Unified	A1	13,678	36,524	50,202	27.25%
13	Sacramento City Unified	A2	6,273	40,660	46,933	13.37%
14	Clovis Unified	Aa2	398	42,866	43,264	0.92%
15	Garden Grove Unified	Aa2	-	42,301	42,301	0.00%
16	Riverside Unified	Aa2	1,445	40,708	42,153	3.43%
17	Stockton Unified	A1	6,379	35,255	41,634	15.32%
18	Sweetwater Union High	A3	1,199	39,165	40,364	2.97%
19	Kern High	Aa2	456	39,884	40,340	1.13%
20	Poway Unified	Aa3	-	36,450	36,450	0.00%

Source: California Department of Education; BoFA Global Research. Note: Qualification reports are based on FY 2018-2019 second interim status report data. Districts not highlighted have a Positive Qualification status.

**Table 12: Average percentage of charter school enrollment by Moody's rating
Largest 20 California school districts only**

Rating	% of charter school enrollment
Aa2	5.87%
Aa3	9.58%
A1	16.61%
A2	13.37%
A3	2.97%

Source: California Department of Education; BoFA Global Research

- We also found that among those 20 districts, districts with Negative or Qualified Certifications generally had a much higher percentage of charter school enrollment compared with those with Positive Certifications. Districts are given a Negative

Certification when it is determined that based upon current projections, the local educational agency (LEA) will not meet its financial obligations for fiscal year 2018-2019 or 2019-2020.

- Similarly, districts with a Qualified Certification may not meet its financial obligations for fiscal year 2018-2019, 2019-2020, or 2020-2021. See Table 11 and Table 12.

Muni relative value

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Ratios

Table 13: Rich/cheap analysis of MMD*/Treasury ratios (As of 9 January 2020)

Maturity	Current Treas	Muni/ Treas	MMD R/C (short-term)	3 mo. max	3 mo. min	3 mo. avg	MMD R/C (long-term)	3 year max	3 year min	3 year avg
3yr	1.594	60.86%	Rich	82.53%	60.36%	68.07%	Rich	90.46%	58.26%	70.78%
7yr	1.767	65.09%	Rich	82.84%	64.39%	72.79%	Very Rich	91.37%	64.39%	76.26%
10yr	1.855	72.80%	Rich	88.30%	71.45%	81.21%	Very Rich	98.50%	71.30%	84.14%
30yr	2.328	85.04%	Very Rich	95.45%	83.44%	91.23%	Very Rich	103.64%	83.44%	96.19%

Source: Thomson Reuters; BofA Global Research. *MMD AAA GO yield curve

Curve slopes

Table 14: Rich/cheap analysis of MMD* slopes (As of 9 January 2020)

	Current slope	Slope S/F (short-term)	3 mo. max	3 mo. min	3 mo. avg	Slope S/CF (long-term)	3 year max	3 year min	3 year avg
1/5s	6	Neutral	9	-4	5	Flat	87	-4	33
1/10s	39	Neutral	48	17	38	Flat	169	14	79
10/30s	63	Steep	65	57	61	Neutral	90	46	69
1/30s	102	Neutral	110	76	99	Flat	245	72	147

Source: Thomson Reuters; BofA Global Research. *MMD AAA GO yield curve

Muni sectors

Analyzing muni sectors' richness/cheapness by rating and maturity, we find that AAA-rated non-prerefunded 7-12yr munis in the GO State sector's OAS increased to around 9bps now, making this week's OAS 10bps higher than the last three-years' average by a very statistically significant amount. As a result, we assign a value of "very cheap" on that particular spot.

Table 15: Current OAS, 7-12yr indexes (bp)

Sector	AAA	AA	A	BBB
Airports		23	35	66
Higher Education	-1	2	28	22
GO Local	11	15	45	128
GO State	9	10	43	138
Health		20	44	67
Hospital		3	42	85
IDR		50	70	89
Leases COPS & Appr.	45	15	42	102
Pollution Control	7		70	
Power	5	7	38	
Tax Revenues	12	11	44	99
Tobacco			61	
Toll & Turnpike		20	26	40
Transportation - Other	17	14	45	100
Utilities - Other	-14	12	45	141
Water & Sewer	10	0	39	87

Source: ICE Data Indices, LLC. Data as of 8 January 2020

Table 16: Rich/cheap OAS analysis, 7-12yr indexes

Sector	AAA	AA	A	BBB
Airports		Cheap	Neutral	Neutral
Higher Education	Neutral	Cheap	Cheap	Rich
GO Local	Very Cheap	Very Cheap	Neutral	Neutral
GO State	Very Cheap	Neutral	Rich	Rich
Health		Neutral	Neutral	Neutral
Hospital		Neutral	Neutral	Rich
IDR		Very Rich	Neutral	Rich
Leases COPS & Appr.	Cheap	Very Cheap	Neutral	Neutral
Pollution Control	Cheap		Neutral	
Power	Cheap	Cheap	Neutral	
Tax Revenues	Neutral	Cheap	Neutral	Rich
Tobacco			Neutral	
Toll & Turnpike		Very Cheap	Neutral	Neutral
Transportation - Other	Very Cheap	Very Cheap	Neutral	Rich
Utilities - Other	Neutral	Very Cheap	Neutral	Neutral
Water & Sewer	Very Cheap	Neutral	Neutral	Neutral

Source: ICE Data Indices, LLC. Data as of 8 January 2020

Table 17: 3-yr avg OAS, 7-12 year indexes (bp)

Sector	AAA	AA	A	BBB
Airports		13	34	60
Higher Education	-2	-4	19	65
GO Local	4	8	59	145
GO State	-1	7	69	172
Health		19	43	71
Hospital		10	33	102
IDR		65	130	155
Leases COPS & Appr.	8	11	39	128
Pollution Control	2		54	
Power	-2	1	34	
Tax Revenues	7	7	53	122
Tobacco			61	
Toll & Turnpike		5	28	72
Transportation - Other	4	8	54	131
Utilities - Other	-18	6	52	120
Water & Sewer	-3	-5	44	93

Source: ICE Data Indices, LLC. Data as of 8 January 2020

Table 18: Current OAS, 22yr+ indexes (bp)

Sector	AAA	AA	A	BBB
Airports		25	34	39
Higher Education	2	7	33	79
GO Local	5	8	41	104
GO State	-5	-6		90
Health		20	41	81
Hospital		7	41	63
IDR			40	50
Leases COPS & Appr.	6	5	20	62
Pollution Control			117	-12
Power		1	27	69
Tax Revenues	3	13	55	66
Tobacco				99
Toll & Turnpike			23	40
Transportation - Other		9	29	73
Utilities - Other	-4	1	34	46
Water & Sewer	4	2	28	

Source: ICE Data Indices, LLC. Data as of 8 January 2020

Table 19: Rich/cheap OAS analysis, 22yr+ indexes

Sector	AAA	AA	A	BBB
Airports		Cheap	Cheap	Rich
Higher Education	Neutral	Cheap	Very Cheap	Cheap
GO Local	Cheap	Neutral	Rich	Neutral
GO State	Cheap	Cheap		Very Rich
Health		Cheap	Cheap	Neutral
Hospital		Neutral	Cheap	Neutral
IDR			Neutral	Neutral
Leases COPS & Appr.	Neutral	Cheap	Very Cheap	Rich
Pollution Control			Cheap	Rich
Power		Cheap	Very Cheap	Neutral
Tax Revenues	Neutral	Cheap	Neutral	Neutral
Tobacco				Neutral
Toll & Turnpike			Neutral	Neutral
Transportation - Other		Cheap	Cheap	Neutral
Utilities - Other	Neutral	Cheap	Neutral	Neutral
Water & Sewer	Cheap	Very Cheap	Cheap	

Source: ICE Data Indices, LLC. Data as of 8 January 2020

Table 20: 3-yr avg OAS, 22yr+ indexes (bp)

Sector	AAA	AA	A	BBB
Airports		7	19	50
Higher Education	5	-4	16	62
GO Local	-6	7	52	129
GO State	-17	-20		140
Health		8	32	75
Hospital		4	30	63
IDR			24	43
Leases COPS & Appr.	11	-3	1	77
Pollution Control			61	19
Power		-8	14	69
Tax Revenues	-5	0	52	67
Tobacco				151
Toll & Turnpike			15	40
Transportation - Other		-5	16	72
Utilities - Other	-10	-15	32	52
Water & Sewer	-3	-13	17	

Source: ICE Data Indices, LLC. Data as of 8 January 2020

Muni chartbook

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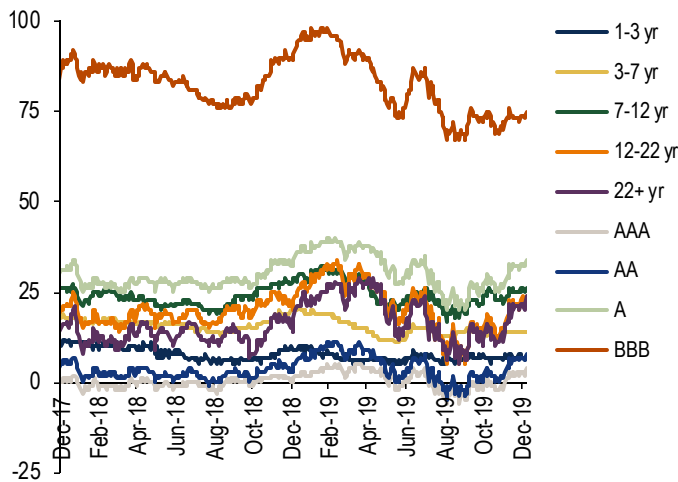
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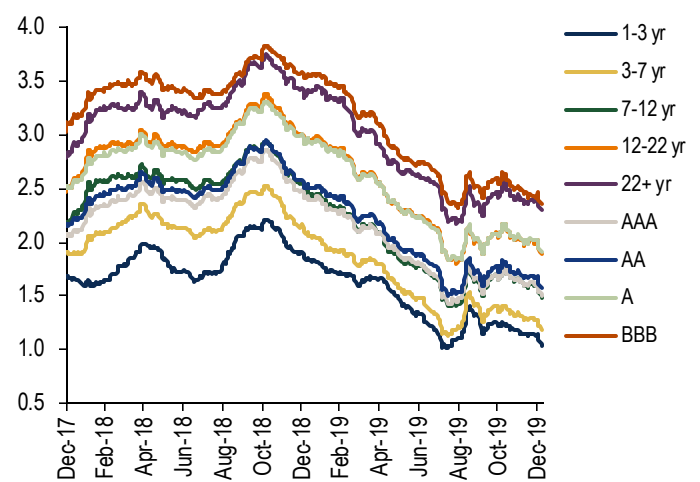
Yields & spreads

Chart 18: OAS for maturity and rating indexes

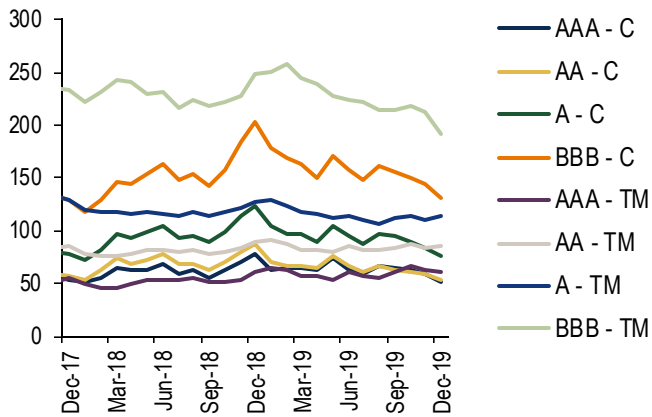


Source: ICE Data Indices, LLC. Data as of 8 January 2020

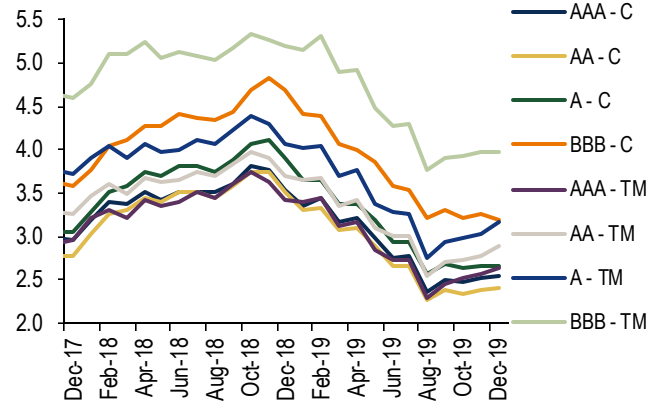
Chart 19: Yield to worst for maturity and rating indexes (%)



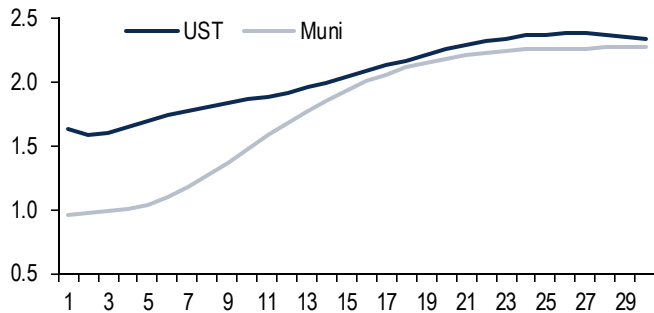
Source: ICE Data Indices, LLC. Data as of 8 January 2020

Chart 20: Taxable muni & HG corporate OAS

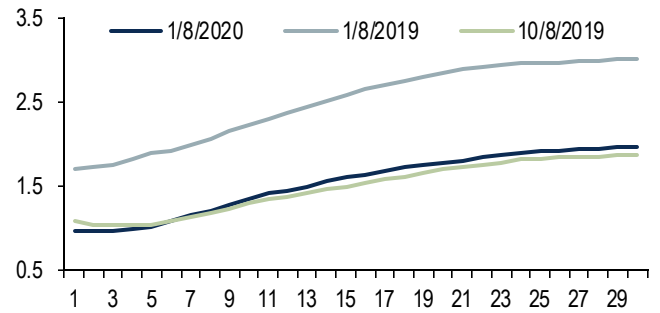
Source: ICE Data Indices, LLC. Note: TM stands for taxable munis (TXMB) and C stands for HG Corporates (COAO).

Chart 21: Taxable muni & HG corporate YTW (%)

Source: ICE Data Indices, LLC. Note: TM stands for taxable munis (TXMB) and C stands for HG Corporates (COAO).

Chart 22: Muni and Treasury yield curves (%)

Source: ICE Data Indices, LLC. Data as of 8 January 2020

Chart 23: Municipal curve movement (%)

Source: Thomson Reuters. Data as of 8 January 2020

Table 21: Average yield, 7-12yr index

Sector	AAA	AA	A	BBB
Airports	-	1.37	1.52	1.96
Higher Education	1.24	1.24	1.53	-
GO Local	1.34	1.38	1.66	2.62
GO State	1.33	1.31	1.67	2.64
Health	-	1.38	1.59	1.67
Hospital	-	1.25	1.58	1.99
IDR	-	1.72	1.91	2.17
Leases COPS & Appr.	1.37	1.35	1.64	2.25
Pollution Control	1.41	-	1.97	-
Power	1.13	1.24	1.57	-
Tax Revenues	1.28	1.30	1.63	2.32
Tobacco	-	-	1.86	2.49
Toll & Turnpike	1.35	1.49	1.47	1.59
Transportation - Other	1.45	1.36	1.68	2.37
Utilities - Other	1.12	1.28	1.68	3.20
Water & Sewer	1.34	1.24	1.59	2.01
Average by Rating	1.31	1.35	1.66	2.25

Source: ICE Data Indices, LLC. Data as of 8 January 2020

Table 22: Yield change, MTD*, 7-12yr index (bp)

Sector	AAA	AA	A	BBB
Airports	-	-11	-11	-13
Higher Education	-11	-11	-11	-
GO Local	-11	-13	-14	-11
GO State	-12	-12	-15	-
Health	-	-12	-11	-
Hospital	-	-11	-15	-21
IDR	-	-10	-11	-10
Leases COPS & Appr.	-11	-12	-11	-11
Pollution Control	-11	-	-11	-
Power	-10	-11	-11	-
Tax Revenues	-14	-13	-12	-11
Tobacco	-	-	-9	-4
Toll & Turnpike	-10	-11	-11	-11
Transportation - Other	-12	-12	-11	-11
Utilities - Other	-11	-12	-11	-4
Water & Sewer	-11	-11	-12	-12
Average by Rating	-11	-12	-12	-11

Source: ICE Data Indices, LLC. *Data as of 8 January 2020

Table 23: Yield change, YTD*, 7-12yr index (bp)

Sector	AAA	AA	A	BBB
Airports	-	-11	-11	-13
Higher Education	-11	-11	-11	-
GO Local	-11	-13	-14	-11
GO State	-12	-12	-15	-11
Health	-	-12	-11	-10
Hospital	-	-11	-15	-21
IDR	-	-10	-11	-10
Leases COPS & Appr.	-11	-12	-11	-11
Pollution Control	-11	-	-11	-
Power	-10	-11	-11	-
Tax Revenues	-14	-13	-12	-11
Tobacco	-	-	-9	-4
Toll & Turnpike	-10	-11	-11	-11
Transportation - Other	-12	-12	-11	-11
Utilities - Other	-11	-12	-11	-4
Water & Sewer	-11	-11	-12	-12
Average by Rating	-11	-12	-12	-11

Source: ICE Data Indices, LLC. *Data as of 8 January 2020

Table 24: Average yield for 22yr+ index

Sector	AAA	AA	A	BBB
Airports	-	2.30	2.25	2.24
Higher Education	2.20	2.04	2.34	2.89
GO Local	2.18	2.30	2.71	3.09
GO State	1.87	1.91	-	-
Health	-	2.30	2.52	2.92
Hospital	-	2.20	2.49	2.79
IDR	-	-	2.24	2.36
Leases COPS & Appr.	-	2.16	2.08	2.86
Pollution Control	-	-	2.48	2.13
Power	-	1.99	2.30	2.56
Tax Revenues	2.08	2.16	2.63	-
Tobacco	-	-	-	3.02
Toll & Turnpike	-	2.10	2.26	2.35
Transportation - Other	-	2.13	2.22	2.87
Utilities - Other	-	1.97	2.28	2.47
Water & Sewer	-	1.94	2.24	-
Average by Rating	2.08	2.12	2.36	2.66

Source: ICE Data Indices, LLC. Data as of 8 January 2020

Table 25: Yield change, MTD*, 22yr+ index (bp)

Sector	AAA	AA	A	BBB
Airports	-	-13	-13	-19
Higher Education	-12	-14	-12	-14
GO Local	-14	-13	-14	-13
GO State	-14	-12	-	-
Health	-	-13	-12	-12
Hospital	-	-14	-13	-14
IDR	-	-	-9	-13
Leases COPS & Appr.	-	-14	-13	-13
Pollution Control	-	-	-13	-11
Power	-	-14	-14	-13
Tax Revenues	-15	-15	-14	-
Tobacco	-	-	-	-5
Toll & Turnpike	-	-13	-14	-12
Transportation - Other	-	-14	-14	-12
Utilities - Other	-	-13	-13	-10
Water & Sewer	-	-13	-14	-
Average by Rating	-14	-13	-13	-12

Source: ICE Data Indices, LLC. *Data as of 8 January 2020

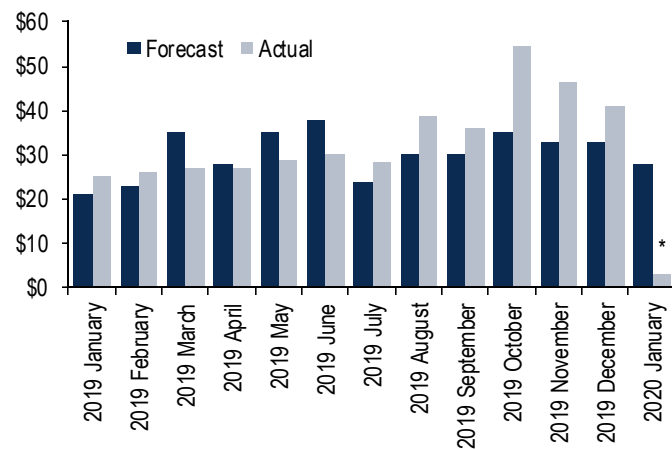
Table 26: Yield change, YTD*, 22yr+ index (bp)

Sector	AAA	AA	A	BBB
Airports	-	-13	-13	-19
Higher Education	-12	-14	-12	-14
GO Local	-14	-13	-14	-13
GO State	-14	-12	-	-
Health	-	-13	-12	-12
Hospital	-	-14	-13	-14
IDR	-	-	-9	-13
Leases COPS & Appr.	-	-14	-13	-13
Pollution Control	-	-	-13	-11
Power	-	-14	-14	-13
Tax Revenues	-15	-15	-14	-
Tobacco	-	-	-	-5
Toll & Turnpike	-	-13	-14	-12
Transportation - Other	-	-14	-14	-12
Utilities - Other	-	-13	-13	-10
Water & Sewer	-	-13	-14	-
Average by Rating	-14	-13	-13	-12

Source: ICE Data Indices, LLC. *Data as of 8 January 2020

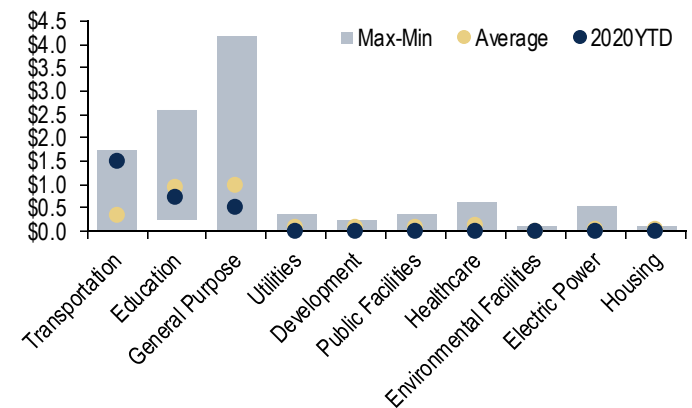
Issuance

Chart 24: Issuance by month, forecast vs actual (\$bn)



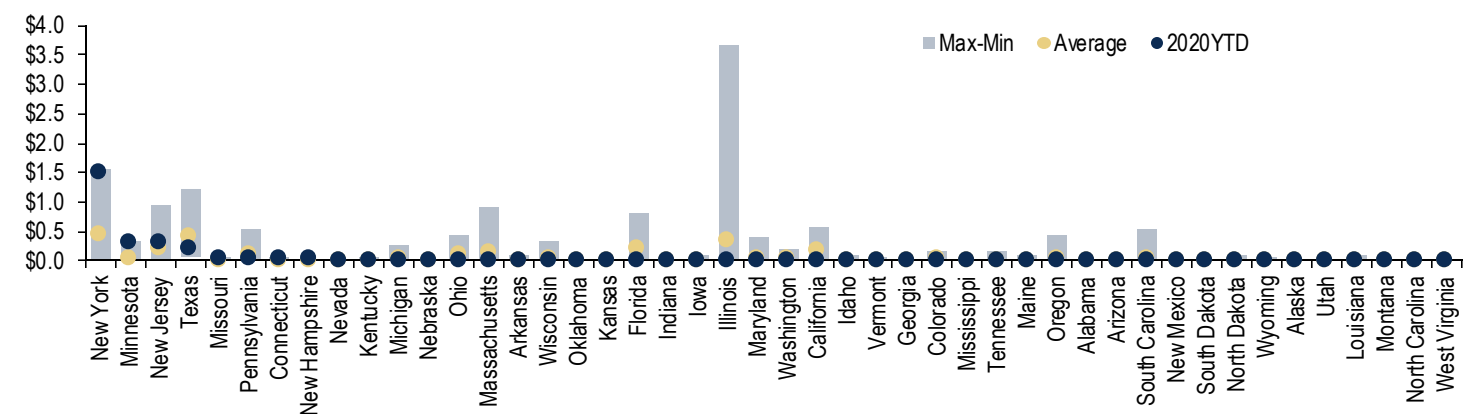
Source: Thomson Reuters; BofA Global Research. *Data MTD as of 8 January 2020

Chart 25: 2020 YTD issuance by sector, vs max, min, avg of past 10 yrs (\$bn)



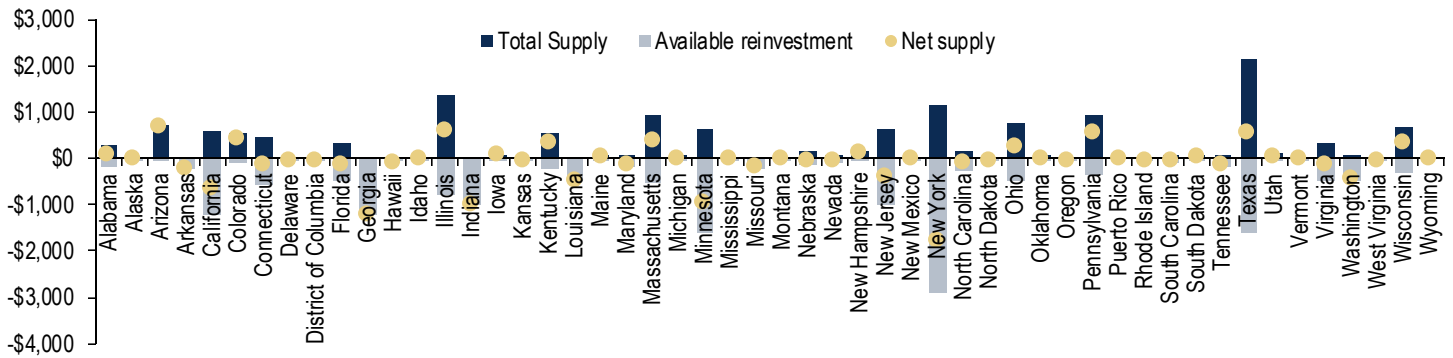
Source: R Thomson Reuters; BofA Global Research. Note: Max, Min and average are YTD level of each year for the past 10 years. Data as of 8 January 2020

Chart 26: 2020 YTD issuance by state, versus max, min, avg of past 10 years (\$bn)



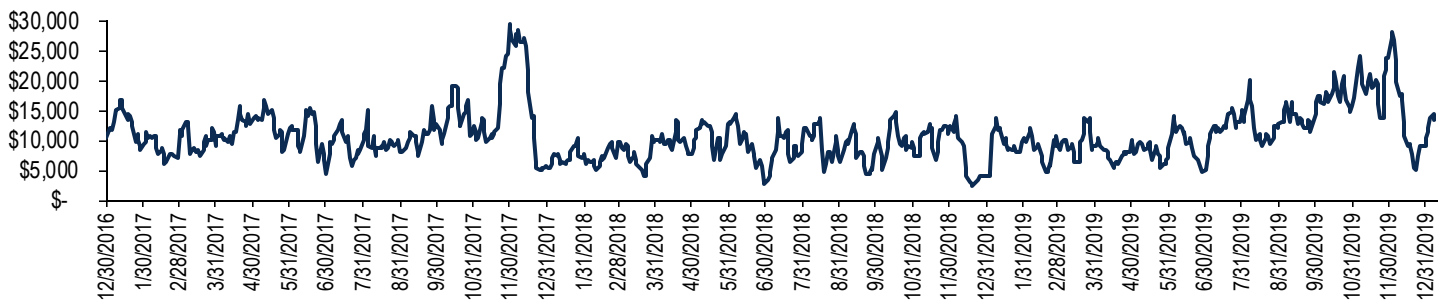
Source: Thomson Reuters; BofA Global Research. Note: Max, Min and average are YTD level of each year for the past 10 years. Data as of 8 January 2020

Chart 27: Net supply estimates, forward 30 days (\$mn)



Source: Bloomberg. Data as of 9 January 2020

Chart 28: Municipal 30 day visible supply volume (\$mn)



Source: Bloomberg. Data as of 9 January 2020

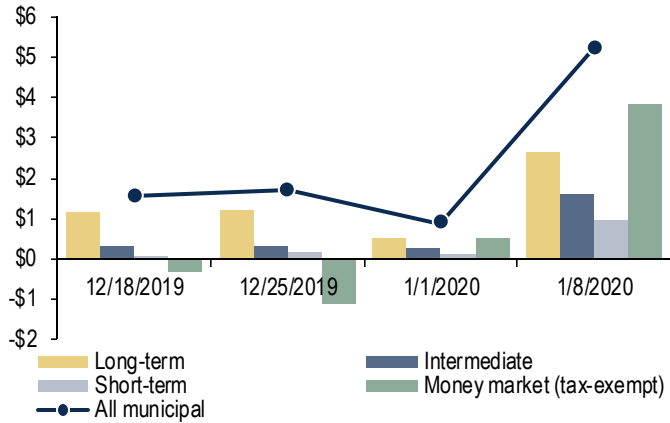
Table 27: Issuance summary (\$mn)

	MTD 8-Jan-20	MTD 8-Jan-19	YTD 8-Jan-20	YTD 8-Jan-19
Total	2,989.0	3,077.0	2,989.0	3,077.0
New Money	2,699.5	2,120.9	2,699.5	2,120.9
Total Refunding	289.5	956.1	289.5	956.1
Advanced refunding	-	4.3	-	4.3
Unknown refunding	289.5	53.3	289.5	53.3
Current & Forward refunding	-	898.5	-	898.5
Insured	47.1	47.5	47.1	47.5
Fixed rate	2,988.3	3,052.1	2,988.3	3,052.1
Variable rate long	-	-	-	-
Variable rate short	-	-	-	-
Linked rate	-	25.0	-	25.0
Zero coupon	0.7	-	0.7	-
Variable rate no put	-	-	-	-
Convertible	-	-	-	-
Tax exempt	2,603.3	1,975.8	2,603.3	1,975.8
Taxable	385.6	1,101.2	385.6	1,101.2
Alternative minimum tax	-	-	-	-
Education	782.7	303.6	782.7	303.6
General Purpose	520.3	2,534.9	520.3	2,534.9
Transportation	1,500.0	2.1	1,500.0	2.1
Healthcare	-	-	-	-
Utilities	49.9	26.1	49.9	26.1
Housing	-	85.0	-	85.0
Development	5.7	20.0	5.7	20.0
Electric Power	127.1	105.2	127.1	105.2
Public Facilities	3.3	0.2	3.3	0.2
Environmental Facilities	-	-	-	-

Source: Thomson Reuters; BofA Global Research

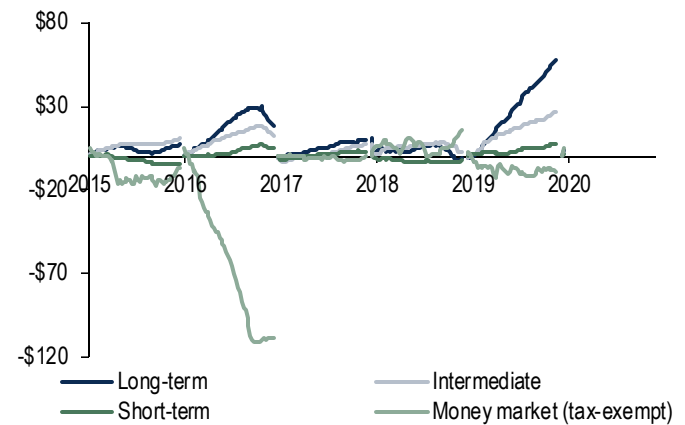
Flows

Chart 29: Municipal fund flows (\$bn)



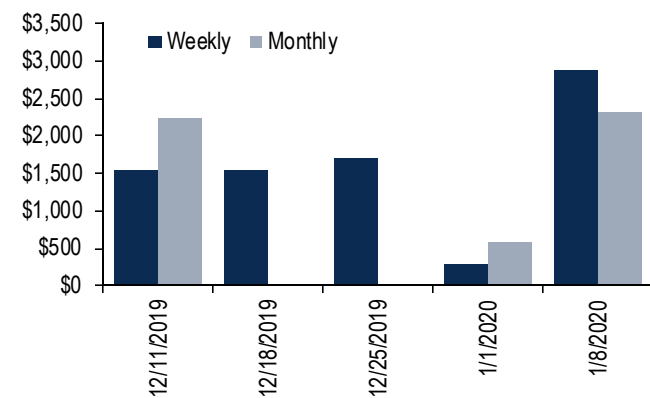
Source: Lipper FMI; ETFs included. *Data includes both weekly and monthly reporting funds as of 8 January 2020

Chart 30: Year-to-date cumulative flows (\$bn)



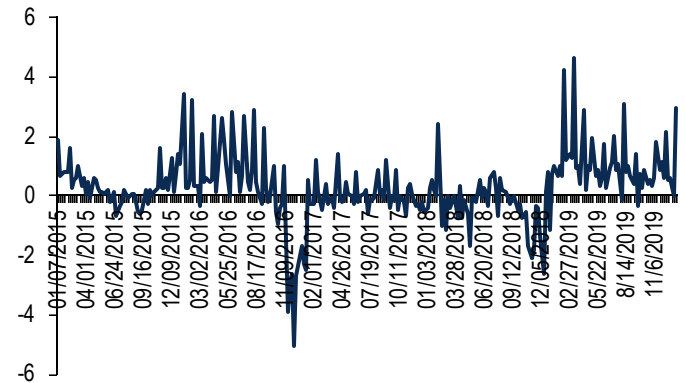
Source: Lipper FMI; ETFs included. *Data includes both weekly and monthly reporting funds as of 8 January 2020

Chart 31: Municipal fund flows (\$mn)



Source: Lipper FMI; ETFs included. *Data includes both weekly and monthly reporting funds as of 8 January 2020

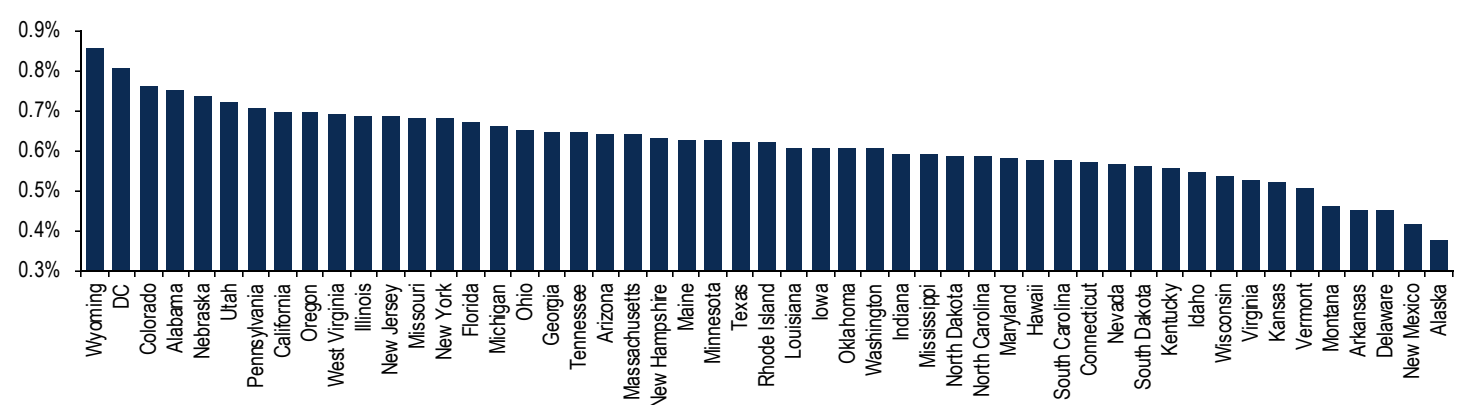
Chart 32: Flow strength indicator*



Source: *The flow strength indicator is measured by 2-year trailing z-score (A positive or negative number does not necessarily suggest buying or selling). Lipper FMI. ETFs included. *Data includes both weekly and monthly reporting funds as of 8 January 2020

Returns

Chart 33: US Municipal Securities Index's total returns by state (%) YTD as of 8 January 2020



Source: ICE Data Indices, LLC

Table 28: Returns summary (%)

	MTD		QTD		YTD	
	Total return	Price return	Total return	Price return	Total return	Price return
US Broad Muni	0.616	0.526	0.616	0.526	0.616	0.526
Muni Master	0.662	0.572	0.662	0.572	0.662	0.572
Gov t Master	0.166	0.114	0.166	0.114	0.166	0.114
Corp Master	-0.052	-0.135	-0.052	-0.135	-0.052	-0.135
Corp High Yield	0.354	0.218	0.354	0.218	0.354	0.218
Muni High Yield	0.490	0.378	0.490	0.378	0.490	0.378
Mortgage Master	0.077	0.099	0.077	0.099	0.077	0.099
AAA Munis	0.660	0.572	0.660	0.572	0.660	0.572
AA Munis	0.648	0.559	0.648	0.559	0.648	0.559
A Munis	0.685	0.592	0.685	0.592	0.685	0.592
BBB Munis	0.685	0.591	0.685	0.591	0.685	0.591
Munis 1-3	0.189	0.090	0.189	0.090	0.189	0.090
Munis 3-7	0.437	0.345	0.437	0.345	0.437	0.345
Munis 7-12	0.665	0.576	0.665	0.576	0.665	0.576
Munis 12-22	0.769	0.681	0.769	0.681	0.769	0.681
Munis 22+	0.887	0.798	0.887	0.798	0.887	0.798
General Obligation	0.614	0.524	0.614	0.524	0.614	0.524
Revenue	0.679	0.589	0.679	0.589	0.679	0.589
Airport	0.692	0.598	0.692	0.598	0.692	0.598
Education	0.740	0.649	0.740	0.649	0.740	0.649
Health	0.645	0.553	0.645	0.553	0.645	0.553
Hospitals	0.824	0.733	0.824	0.733	0.824	0.733
Industrial Revenue	0.825	0.727	0.825	0.727	0.825	0.727
Leasing & rental	0.575	0.482	0.575	0.482	0.575	0.482
Miscellaneous	0.632	0.541	0.632	0.541	0.632	0.541
Multi-family housing	0.740	0.672	0.740	0.672	0.740	0.672
Pollution control	0.545	0.459	0.545	0.459	0.545	0.459
Power	0.548	0.454	0.548	0.454	0.548	0.454
Single-family housing	0.605	0.527	0.605	0.527	0.605	0.527
Tax	0.732	0.642	0.732	0.642	0.732	0.642
Tobacco	0.488	0.395	0.488	0.395	0.488	0.395
Toll & turnpike	0.704	0.615	0.704	0.615	0.704	0.615
Transportation	0.667	0.578	0.667	0.578	0.667	0.578
Utilities-other	0.633	0.542	0.633	0.542	0.633	0.542
Water & sewer	0.617	0.525	0.617	0.525	0.617	0.525
Tax able Muni	0.450	0.357	0.450	0.357	0.450	0.357
Build America Bonds	0.469	0.365	0.469	0.365	0.469	0.365

Source: ICE Data Indices, LLC. Data as of 8 January 2020

Cross currency equivalent yields

Table 29: Cross currency equivalent yields

	Government bonds yield (in investor country's currency)			Cross currency equivalent yield*						Can foreign investors buy?					
				US Treasury			US AAA taxable municipal bond			US Treasury			US AAA taxable municipal		
	5 year	10 year	30 year	5 year (1.650)	10 year (1.849)	30 year (2.324)	5 year (2.0)	10 year (2.53)	30 year (3.22)	5 year	10 year	30 year	5 year	10 year	30 year
Canada	1.594	1.593	1.713	1.845	2.022	2.396	2.198	2.703	3.294	Yes	Yes	Yes	Yes	Yes	Yes
United Kingdom	0.612	0.817	1.300	0.835	1.028	1.982	1.185	1.708	2.869	Yes	Yes	Yes	Yes	Yes	Yes
France	-0.336	0.061	0.879	-0.356	-0.024	1.545	-0.009	0.651	2.421			Yes	Yes	Yes	Yes
Germany	-0.496	-0.184	0.323	-0.356	-0.024	1.545	-0.009	0.651	2.421	Yes	Yes	Yes	Yes	Yes	Yes
Italy	0.683	1.374	2.447	-0.356	-0.024	1.545	-0.009	0.651	2.421				Yes	Yes	Yes
Spain	-0.087	0.447	1.338	-0.356	-0.024	1.545	-0.009	0.651	2.421			Yes	Yes	Yes	Yes
Portugal	-0.108	0.398	1.299	-0.356	-0.024	1.545	-0.009	0.651	2.421			Yes	Yes	Yes	Yes
Netherlands	-0.461	-0.105	0.315	-0.356	-0.024	1.545	-0.009	0.651	2.421	Yes	Yes	Yes	Yes	Yes	Yes
Switzerland	-0.696	-0.540	-0.227	-0.356	-0.024	1.545	-0.009	0.651	2.421	Yes	Yes	Yes	Yes	Yes	Yes
Japan	-0.119	-0.009	0.421	-0.456	-0.404	1.391	-0.108	0.268	2.261			Yes	Yes	Yes	Yes
Australia	0.853	1.233	1.839	1.172	1.647	2.239	1.522	2.325	3.131	Yes	Yes	Yes	Yes	Yes	Yes
South Korea	1.481	1.677	1.625	1.055	1.536	2.193	1.404	2.215	3.087			Yes	Yes	Yes	Yes
China	2.859	3.111	3.687	2.914	2.518	2.603	3.267	3.203	3.511	Yes			Yes	Yes	
Taiwan	0.574	0.631	0.793	-0.068	0.942	1.946	0.276	1.618	2.826		Yes	Yes		Yes	Yes
Singapore	1.527	1.732	2.079	1.452	1.746	2.28	1.802	2.425	3.175		Yes	Yes	Yes	Yes	Yes

Source: Bloomberg; BofA Global Research. *Cross currency equivalent yield is the yield for an international buyer to purchase US bond in dollar and convert back to its own country's currency. As of 9 January 2020

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